4.5 gm., or 67 grains of the anti-epileptic salts per diem. Also, more or less regularly, a pill containing arsenious acid 0.001, podophyllin 0.004, ext. belladonna 0.015, quin. sulph. 0.20, after each meal. This treatment is to be continued faithfully while away. Is to avoid over-exertion, excitement, and exposure to great heat.

ON THE INFLUENCE OF BODILY MOVEMENTS OVER SEPTIC ABSORPTION.

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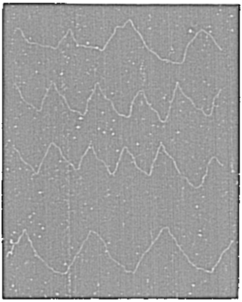
It is well known that the act of respiration is composed of four periods, namely, inspiration, expiration, and an interval between each, called pauses. Ordinarily, the duration of the pauses is much shorter than that of the other stages; and of the pauses, that between expiration and inspiration the shorter; and of the respiratory acts the inspiratory rather the shorter.

The inspiratory act increases the capacity of the thorax by increasing its diameter—most apparent at its base—and also by depressing the diaphragm, or, in other words, by obliterating, in a degree, its natural upward convexity. This alteration of shape is effected by its own muscular action, and by the stretching effect produced by the increased diameter of its circumferential attachments; normally, these movements are synchronous. When, then, by the act of inspiration the capacity of the chest is increased, a tendency to vacuum exists, which is corrected by two methods: 1st, by the ingress of air through the larynx; 2d, by the flow of blood through the various veins leading toward the heart; for, during inspiration, the normal support of these vessels, which exists during the pause preceding, is lessened, and thus the external air-pressure existing on the general vascular system immediately acts, and corrects the lessened tension by pressing the blood heartward. Thus, in the respiratory act we have a force of considerable influence supplementing the heart-action.

But there is another part of the body which it is also necessary to consider before we can fully apply these facts to the elucidation of our subject. When the diaphragm descends it presses on the contents of the abdomen, and these being more or less plastic, obeying the laws of elastic fluids, press correspondingly in all directions. And although the increased diameter of the base of the chest, to which the walls of the abdomen are attached, would tend to increase the capacity of the abdomen at the upper part, and thus lessen the pressure within the abdomen, yet there is a marked residuum of pressure during each inspiration. This can readily be registered if we employ an apparatus similar to the cardiograph tied tightly to the abdomen, which may be called a gastrograph. The index will show a line wavelike as in the tracings (Fig. 1). The relative duration of inspiration, pause, expiration, and pause is well indicated.

FIG. 1.



Ordinary respiratory wave of the abdomen.

I have, hitherto, been speaking of normal respiration, If, however, a sudden inspiratory movement takes place, voluntary or otherwise, before the depression of the diaphragm can occur, then, instead of there being a residuum pressure in the abdomen, there is a tendency to a vacuum. Again, if, by voluntary effort, or by any restraint, the ribs are unable to rise—in other words, the base of the thorax cannot expand—then there is an increase of the pressure when the diaphragm descends; the usual condition resulting from tight-lacing, or the use of the belt.

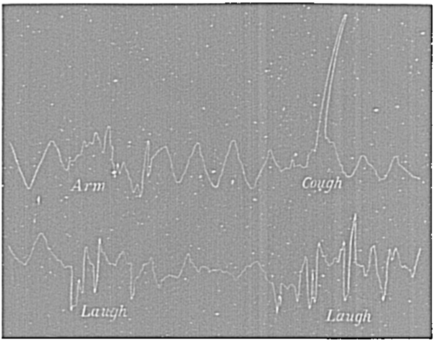
If the effect of sudden inspiration be to produce a vacuum within the abdomen, as it does within the thorax, then its importance, as a possible source of danger, must be self-evident to any one who has studied medicine.

No doubt the elasticity of the abdominal walls and their yielding nature materially minimize the effects of the thoracic vacuum, yet it can readily be shown that it is not completely reduced, and, under some conditions, scarcely at all.

Let me call the attention of the reader to the copies of tracings made under various conditions from the gastrograph.

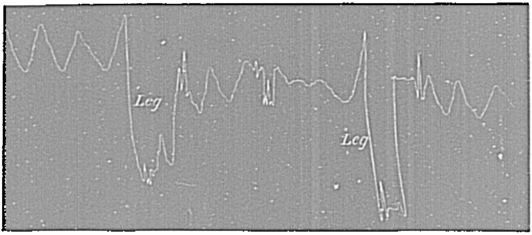
In Fig. 2 will be perceived the effects of coughing, laughing, etc. The higher lines show temporary increase of pressure from within; while the lower indicate an increase from without; in other words, the tendency to vacuum. Referring, then, to Fig. 2, a rising and falling of the line will be noticed on the ordinary movements of the legs, arms, or trunk. This was from a person lying on his back. But the same effect, though in varying degrees, is found to follow all the movements of the body, the more markedly the more suddenly they are done, whether of the legs, arms, head, or trunk (Fig. 3). It is, doubtless, produced by

FIG. 2.



The effects of movements of the arm and of coughing and laughing on the respiratory wave of the abdomen.

FIG. 3.



The effect of movements of the legs upon the respiratory wave of the abdomen.

the sudden inspiration taken in order to fix the thorax preparatory to the action of the various muscles attached to its various parts, especially the abdominal muscles, which assist in fixing the thorax and consolidating the firmness of the trunk.

It has long been believed that there is a tendency, under certain conditions, to the existence of an insuck or indraw in connection with the inspiratory act, but I think I have now given demonstrable proof of the existence of a momentary excess of both pressure and vacuum within both chest and abdomen.

Let us for a few moments glance at the effect of such a vacuum.

For the reasons above given there is a corresponding sudden rush toward the chest in the veins principally; and doubtless also in the lymphatics; at the same time the outward current in the arteries would by the same force be checked. An opportunity would thus be given for the dislodgement of any clots which might have been formed in the veins. So also in the case of wounds a facility is given for any unhealthy material to be drawn into the current through the severed ends of veins or lymphatics, such as a portion of the plug, which might be purulent or ichorous. Doubtless in conditions of perfect health these accidents would generally be guarded against by the firmness of the plugs, and the absence of irritating matter, but in a wound in an unhealthy state, contrary conditions are present favoring the translation of portions of unhealthy plugs or of septic matter in a more fluid state. And if we admit the possibility of these things occurring, how much more are they likely to take place in the puerperal woman, or in other similar conditions, where every facility is given for the formation and increase of sepsis in consequence of the retention of sanious fluids at a high temperature scantily supplied with air; and where easy opportunity exists for its absorption through recently divided vessels of large calibre. Indeed, in practice I have, I think, had sufficient evidence to prove that vigorous movements of the puerperium have been important factors in initiating attacks of septic fever, and of renewing them during their subsidence. Unless I am much mistaken, the renewal of the attacks of rigors, fever, and sweating, has been produced by such movements. At any rate, I have known cases where these attacks have followed each time the patient had been much moved—I mean by getting out of bed, sitting up, or changing room. So much has this impressed me by frequent occurrence, that on seeing patients in consultation, with an account of renewals of shiverings, etc., I have made special inquiries, and found very frequently that these have followed those disturbances.

But if these conclusions are correct, another question will present itself to us. May we not, in manipulating the uterus freely charged with unhealthy fluids within, be favoring unwittingly septic infection, especially if the patient has been already under its influence? That this is probable seems to be borne out by the fact that I have observed in many cases where I have been obliged, in consequence of hemorrhage or fever, to remove from the interior of the uterus retained portions of placenta and firm clots; indeed, I look forward to a slight increase of fever after these manipulations. The sudden removal of the hand after firmly pressing in the abdominal walls might, it appears to me, somewhat favor an indrawing.

There is another circumstance in the puerperal state which can also favor septic absorption from the inner surface of the uterus; namely, the sudden turning on the side from the back. At this time the walls of the abdomen are very often relaxed and flabby; so that when the patient rolls over on her side, the abdomen and uterus fall over in a marked degree if unsupported; and thus there is a tendency to a vacuum determining a flow toward the abdominal cavity. If any one doubts this tendency, he has only to place a woman with relaxed parts and flaccid abdominal walls in the knee-elbow posture and open the vulva with two fingers, and he will at once perceive that the inrush of air is very marked. We take advantage of this fact in our attempts to restore the retroflected pregnant or heavy uterus.

But the principle which underlies these facts does not belong only to the puerperium, but to all cases under like conditions in abdominal and gynecological surgery. It is not needful for me to indicate to surgeons the importance of the above considerations as bearing on the surgery of the chest, but I may be allowed to repeat that rapid movements, even of, apparently only, the legs, produce a quick result on the capacity of the chest.

It is difficult to gauge the practical importance of these considerations. As above remarked, the conservative forces of perfect health neutralize much of the effects of sharp movements, but in opposite states it appears to me that we should permit the patient to assist him or herself as little as possible in those conditions where the kind of injury facilitates septic absorption, or in cases of venous inflammation with plugging. The importance of this caution was sadly illustrated in the case of one who was my fellow-student. He was very athletic, and had, at the age of forty, from over-exercise, inflammation of one of the veins of his leg. He had lain quiet for some days, when, suddenly turning in bed, he felt that something had flown from his leg to his heart; he expressed a fear that he would be dead in a few days. which was the case. Symptoms of blocking of the pulmonary arteries soon came on.

Theoretically, I suppose, we may say that by mechanically checking or restraining the elevation of the ribs and abdomen by a bandage we, in a very considerable degree, lessen the risk attending rapid and sudden movements. But my object in this communication is rather to demonstrate the effect of bodily movements, leaving it to your readers to improve upon my remarks.

There are other interesting points in connection with this subject, for an exposition of which I may refer the reader to the *Proceedings of the Medical Society of London*, 1883, "On the Tension in the Abdomen," and to "Notes," Royal Society's *Proceedings*, "On the Supplementary Forces Concerned in the Abdominal Circulation in Man," March 25, 1879.

I should add that where the abdomen is distended the effect of inspiration or bodily movements to produce a vacuum is necessarily lessened.

SIMPLE ULCER OF THE DUODENUM.

ROUND PERFORATING ULCER OF THE DUODENUM, WITH THE HISTORY OF A CASE.[1]

By W. W. Johnston, M.D.,
of Washington, D. C.

Simple, round, or perforating ulcer of the duodenum is of the same nature as the round, perforating ulcer of the stomach, but while the pathological anatomy and symptomatology of gastric ulcer have long been fully known, duodenal ulcer has still an undetermined place in medical pathology.

Gastric ulcer was first anatomically described by Mathew Baillie in 1793, and the symptoms recognized by John Abercrombie in 1824, but to Cruveilhier is due the credit of having first given a full and accurate description of the disease in its anatomical and clinical details, in his great work published in 1830. In 1839 Rokitansky made seventy-nine cases the basis for a very elaborate study of the disease, and since that date but few material additions have been made to our knowledge of the lesion and its symptoms.

Duodenal ulcer has a much more recent history; the first[2] undoubted example which I have been able to find, was reported in 1828 (Robert, *Bull. Soc. Anat. de Paris*, 1828, iii. p. 171); the description of the lesion in this case is strictly accurate. The patient, a youth, aged seventeen years, suffered for several months with vague pains in the epigastric region; after this he had nausea, loss of appetite, and general malaise. Perforation of the ulcer took place after a full meal, and death resulted from subacute peritonitis. At the origin of the duodenum, immediately below the pylorus, was an oval ulcer, three to four lines in diameter, the

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[1] Read before the Medical Society of the District of Columbia.

[2] Telllais alluded to an observation of duodenal ulcer, in a thesis of 1824, but I have not been able to find it.